Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

Amend claims 1-4.

Cancel claims 5-9.

Add new claims 10-26.

1. (Currently amended) An [A]adhesive bond between a substrate material having a surface and a solid region proximate to the surface comprised of polymer compounds with a low active surface energy, and another material, wherein

~~characterized in that~~

a nano-structured transition region [[(6)]] comprising nano-composites [[(5)]] is formed between the substrate material and the other material ~~connected materials (1, 4),~~ in such a way that this region has a layer thickness between 20 nm and 20 µm and is predominantly formed of nano-composites [[(5)]], and [[that]] wherein [[the]] a ratio of substrate material [[(1)]] to the other material [[(4)]] in a direction transverse to the transition region changes from predominantly substrate material in the immediate vicinity of the substrate material [[(1)]] to predominantly the other material in the immediate vicinity of the other material [[(4)]], with the substrate material [[(1)]] transitioning into the other material [[(4)]] with a nano-structure.

2. (Currently amended) The [A]adhesive bond according to claim 1,

~~characterized in~~

~~that~~ wherein the transition region [[(6)]] comprises metal fractions [[and/]] or metal compounds~~,~~

~~in particular nano-composites (5) containing metal polymers~~.

3. (Currently amended) The [A]adhesive bond according to claim 1 ~~or 2,~~

~~characterized in that~~

wherein the transition region [[(6)]] comprises diamond-like components~~, such as nano-composites (5) containing α-C:H~~.

4. (Currently amended) The [A]adhesive bond according to claim 1~~, 2 or 3, characterized in that~~
wherein the transition region [[(6)]] comprises nano-composites [[(5)]] containing fluoropolymers.

Claims 5 - 9 (Canceled).

10. (New) A composite structure comprising

a substrate material of a first composition having a surface and a solid region proximate to the surface comprised of a polymer compound with a low active surface energy,

another material of a second composition disposed on the solid region of the substrate, and

a nano-structured transition region formed between the solid region of the substrate and the other material, said nano-structured transition region having a layer thickness between 20 nm and 20 μm and comprising predominantly nano-composites,

wherein a composition of the nano-composites changes from a composition substantially identical to that of the substrate material proximate to the substrate material to a composition substantially identical to that of the other material proximate to the other material.

11. (New) The composite structure of claim 10, wherein the nano-composites comprise metal fractions or metal compounds, or both.

12. (New) The composite structure of claim 10, wherein the nano-composites comprise metal polymers.

13. (New) The composite structure of claim 10, wherein the nano-composites have a diamond

structure.

14. (New) The composite structure of claim 10, wherein the nano-composites comprise α-C:H.

15. (New) The composite structure of claim 10, wherein the nano-composites comprise fluoropolymers.

16. (New) A method for producing an adhesive bond between a substrate material having a surface and a solid region proximate to the surface which includes polymer compounds with a low active surface energy, and another material, comprising the steps of:

nano-indenting a solid region of the substrate material proximate to the surface having the polymer compounds with a low active surface energy to form a nano-indented surface,

activating the nano-indented surface by an excitation process which excites molecules of the polymer compounds, and

depositing the other material on the activated nano-indented surface particle-by-particle by a physical vapor deposition (PVD), by a chemical vapor deposition (CVD) process or by cathode sputtering, or by a combination thereof, while the polymer molecules are still in an energetically excited state, until the solid region proximate to the surface of the substrate material is completely covered with the other material.

17. (New) The method of claim 16, wherein the excitations process comprises a process selected from the group consisting of ion bombardment, ion beam processing, plasma processing, electron beam processing and laser beam processing.

18. (New) The method of claim 16, wherein the other material is deposited concurrently with activating the nano-indented surface.

19. (New) The method of claim 16, wherein the other material is deposited in parallel with activating the nano-indented surface.

20. (New) The method of claim 16, wherein nano-indenting the solid region of the substrate material proximate to the surface is performed in a separate process.

21. (New) The method of claim 16, wherein depositing the other material starts with a low deposition rate, with the deposition rate increasing continuously or step-wise until the other material completely covers the solid region proximate to the surface of the substrate material.

22. (New) The method of claim 16, wherein the other material is a non-metallic material, the method further comprising the step of depositing metal fractions on the activated nano-indented surface at least during a first phase of the particle-by-particle deposition of the other material.

23. (New) The method of claim 16, wherein the nano-indented surface is activated in a vacuum and the other material is also deposited particle-by-particle in a vacuum.

24. (New) The method of claim 23, wherein the vacuum has a pressure between approximately $1x10^{-1}$ mbar and $1x10^{-5}$ mbar.

25. (New) The adhesive bond of claim 1, wherein the transition region comprises metal polymers.

26. (New) The adhesive bond of claim 1, wherein the transition region comprises nano-composites containing α-C:H.